Proposition 1E Stormwater Flood Management Grant Proposal
Lake Wohlford Dam Replacement Project
Attachment 6: Monitoring, Assessment, and Performance Measures

Attachment 6 consists of the following items:

- ✓ **Performance Measures.** The purpose of this attachment is to describe the monitoring, assessment, and performance measures that will be used to evaluate the *Lake Wohlford Dam Replacement Project*. These measures will ensure that this proposal meets its intended goals, achieves measurable outcomes, and provides value to the Region and the State of California.

Specific monitoring and performance measures have been developed to assess performance of the *Lake Wohlford Dam Replacement Project* on an ongoing basis. The purpose of this attachment is to provide a discussion of the monitoring system to be used to quantify and verify project performance with respect to the project benefits or objectives identified.

This attachment will also discuss how monitoring data will be used to measure the performance in meeting the overall goals and objectives of the San Diego IRWM Plan. As such, this attachment contains a Project Performance Measures table for the project, which includes the following:

- Project goals
- Desired outcomes
- Output indicators – measures to effectively track output
- Outcome indicators – measures to evaluate change that is a direct result of the work
- Measurement tools and methods
- Targets – measureable targets that are feasible to meet during the life of the project

Performance Measures

The *Lake Wohlford Dam Replacement Project* is intended to address flooding, water supply, water quality, and recreational issues within and downstream of Lake Wohlford. The proposed project would construct an earth-core rockfill dam to replace the existing Lake Wohlford Dam. This would reduce seismic-related flood hazards associated with dam instability, as well as allow Lake Wohlford to retain water at its 6,500 AF design capacity, reduce future potential erosion downstream of the lake, and increase the recreational capacity of the lake. To ensure that the project meets intended goals, assessments or monitoring programs will be implemented to document progress.

Project Goals

Mitigate the potential for severe downstream flood inundation to occur due to failure of the existing Lake Wohlford Dam: This project would reduce seismic-related flooding hazards associated with the existing Lake Wohlford Dam, which is 114 years old and classified as seismically unstable. This issue would be resolved by replacing the existing Lake Wohlford Dam with a seismically-sound earth-core rockfill dam. Replacing the existing Lake Wohlford Dam would substantially reduce infrastructure, ecosystem, public safety, and health impacts that are associated with potential flooding hazards.

Monitoring for seismic stability of the newly erected Lake Wohlford Dam would occur through annual reporting that is required through the Federal Energy Regulatory Commission (FERC) and the California Department of Water Resources (DWR) Division of Safety of Dams (DSOD). In addition, the City of Escondido would conduct ongoing daily inspections, telemetry readings, and erosion control activities that are currently conducted for the existing Lake Wohlford Dam.

Increase the local supply capacity of Lake Wohlford to its built capacity of 6,500 AF: Replacing the existing Lake Wohlford Dam with a seismically-sound earth-core rockfill dam would allow the City of Escondido to increase the supply held within Lake Wohlford to its built capacity of 6,500 AF.

Measuring the local supply capacity of Lake Wohlford would occur through annual reporting required by FERC and DSOD. This project would include consultation with a Board of Consultants approved by FERC to ensure that the newly erected Lake Wohlford Dam is of substantial seismic stability to allow for an increase in the water surface elevation of Lake Wohlford.

Provide maximum protection from uncontrolled storm runoff and erosion-related water quality impacts: If the existing Lake Wohlford Dam were to fail, it would generate high volumes of rapid flows, which would cause scour, erosion, and excessive sedimentation within all tributaries downstream of Lake Wohlford. During extreme wet weather, current capacity restrictions sometimes require the City of Escondido to discharge excess water into Escondido Creek, which discharges to the Pacific Ocean through the San Elijo Lagoon. Both Escondido Creek and San Elijo Lagoon experience substantial water quality impairments, which may be exacerbated by increased storm flows and velocities resulting from Lake Wohlford discharges.

This project objective would be measured by monitoring discharges that occur from Lake Wohlford to Escondido Creek, and comparing those discharges to currently measured discharge values. These discharges would be used as a proxy by which to assess the potential water quality benefits that could occur to Escondido Creek and San Elijo Lagoon with implementation of the *Lake Wohlford Dam Replacement Project*. In addition, erosion control operations and maintenance data would be utilized to assess erosion associated with the newly erected Lake Wohlford Dam. In addition, annual reporting required by FERC and DSOD would determine the seismic stability of the newly erected Lake Wohlford Dam, which would be used as a proxy by which to measure potential downstream scour and erosion that would occur if the dam were to fail.

Increase local emergency supply reliability by increasing local storage capacity: Lake Wohlford is a local water supply reservoir, and is therefore considered part of the San Diego local emergency supply. By increasing the supply capacity of Lake Wohlford, this project would increase the amount of local emergency supply available within the San Diego Region.

This project objective would be measured and monitored in the same manner as discussed above for increasing local supply capacity. Annual reporting and consultation with FERC and DSOD would determine if the newly erected Lake Wohlford Dam is of sufficient seismic stability to allow the City of Escondido to increase its supply capacity to 6,500 AF. The current local storage capacity before implementation of the project would be compared to post-implementation values to assess contributions that the *Lake Wohlford Dam Replacement Project* is making towards increasing local emergency supply reliability. In addition, local supply reliability that is assessed within the City of Escondido's Urban Water Management Plan would be compared before and after implementation of the project.

Increase recreational opportunities within and surrounding Lake Wohlford: Lake Wohlford provides many recreational uses, and is widely considered a regional fishing destination. By implementing this project, the capacity, depth, and therefore volume and surface area of Lake Wohlford would increase. This would provide increased habitat for aquatic species (including fish), which would in turn enhance recreational fishing opportunities within Lake Wohlford.

The project objective would be monitored by comparing the maximum allowable depth, capacity, and surface area of Lake Wohlford before and after completion of the project, as well as the number of recreational visitors to Lake Wohlford annually.

Monitoring System

Baseline data regarding existing conditions have been collected over the past thirty years through FERC and DSOD reporting, along with environmental documentation and numerous data and studies that have been conducted for the existing and proposed Lake Wohlford Dam. In addition, the City of Escondido currently conducts daily inspections, telemetry readings, and erosion control for the existing Lake Wohlford Dam.

Following completion of the *Lake Wohlford Dam Replacement Project,* the City of Escondido would continue to assess the safety and structural integrity of the Lake Wohlford Dam in accordance with requirements set forth by FERC and DSOD. In addition, the City would continue to conduct operations and maintenance efforts that they conduct for the existing dam, including daily inspections, telemetry readings, and erosion control efforts.

Lastly, the City of Escondido is an urban water supplier and is therefore required to produce and update an Urban Water Management Plan (UWMP). The UWMP updates generally occur every five years, and are expected to continue following completion of the *Lake Wohlford Dam Replacement Project.* Through this process, the City would analyze local supply reliability and viability, as well as emergency supply availability, including that available within Lake Wohlford.

The data management and monitoring deliverables described herein are consistent with the IRWM Plan Standards and Guidance – Data Management Standard and will be used by the San Diego IRWM region to evaluate project performance. In addition, monitoring and assessment of the *Lake Wohlford Dam Replacement Project* is consistent with the *Water Quality Control Plan for the San Diego Basin 9 (Basin Plan)* and will be used by the San Diego RWQCB to evaluate watershed health.

Alignment with IRWM Goals

As demonstrated within Attachment 3, the project objectives established for the *Lake Wohlford Dam Replacement Project* align with the objectives of the San Diego IRWM Plan such that this project would meet six of the nine IRWM Plan objectives. The monitoring data presented in Table 6-1 below will be used to concurrently track success of the *Lake Wohlford Dam Replacement Project* goals while also measuring the performance of the project in meeting the overall goals and objectives of the IRWM Plan. This monitoring data will be provided to the San Diego IRWM program for use in tracking the success of funded projects.

Table 6-1: Project Performance Measures

Benefit Type	Project Goals	Desired Outcomes	Output Indicators	Outcome Indicators	Measurement Tools and Methods	Targets
Reduced Flooding	Mitigate the potential for severe downstream flood inundation to occur due to failure of the existing Lake Wohlford Dam	Reduce the potential for a seismic-related failure of Lake Wohlford Dam	Seismic stability of Lake Wohlford Dam	Potential risk that a moderate to large seismic event would result in failure of Lake Wohlford Dam	FERC and DSOD annual monitoring reports and City of Escondido operations and maintenance reports for with and without project conditions	Eliminate the risk that a moderate to large seismic event would result in failure of Lake Wohlford Dam
Increase Local Water Supply	Increase the local supply capacity of Lake Wohlford to its built capacity of 6,500 AF	Increase the local supply capacity of Lake Wohlford to 6,500 AF	Maximum allowable capacity of Lake Wohlford	Comparison of with and without project maximum allowable capacity of Lake Wohlford	FERC and DSOD annual monitoring reports for with and without project conditions	Increase the local supply capacity of Lake Wohlford to 6,500 AF by 2016
Reduction in Storm Water and Discharge Flows	Provide maximum protection from uncontrolled storm runoff and erosion-related water quality impacts	Reduce source pollutants associated with sedimentation from entering water bodies downstream of the project	Reduce levels of sediment entering Escondido Creek from the project area	Reduced erosion and discharge flows from Lake Wohlford and Lake Wohlford Dam Potential risks of water quality issues resulting from failure of Lake Wohlford Dam	City of Escondido dam releases and erosion control monitoring results FERC and DSOD annual monitoring reports	Reduce total release volumes and potential for sedimentation in downstream Escondido Creek Eliminate the risk that dam failure would result in downstream water quality impacts
Increase Local Supply Reliability	Increase local emergency supply stability by increasing local storage capacity	Increase local emergency supply available for the City of Escondido	Total available emergency supply available for the City of Escondido	Increase local emergency supply availability	FERC and DSOD annual monitoring reports for with and without project conditions City of Escondido UWMP reliability assessment	Increase the local emergency supply by 3,000 AFY by 2016
Recreational Improvements	Increase recreational opportunities within and surrounding Lake Wohlford	Increase the amount of surface area within Lake Wohlford that provides recreational opportunities	Surface area (square feet) and volume (cubic feet) of Lake Wohlford available to the public	Amount of open space (lake surface area and volume) within Lake Wohlford available to the public	Surface area and volume of Lake Wohlford for with and without project conditions Number of annual recreational visitors to Lake Wohlford	Increasing the surface area and volume of Lake Wohlford available for fishing and other recreational activities